



Patent Application for:  
**METHOD AND APPARATUS FOR IMPLEMENTING A FULLY DYNAMIC LOCK-  
FREE HASH TABLE**

Inventor(s): Paul A. Martin et al.

Application No.: 10/674,942 Filing Date: September 29, 2003

Please stamp and confirm receipt in the U.S. Patent Office of the following:

- ☐ Missing Parts of Application Transmittal:
- ☐ Combined Declaration and Power of Attorney
  - ☐ Joint Assignment and Form 1595
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  - ☐ Fee: \$

- ☐ Verified Statement Claiming Small Entity Status
- ☐ Extension of Time [ \_\_\_ month(s)]: Fee \$ \_\_\_\_\_
- ☐ Request for Corrected Filing Receipt: Fee \$ \_\_\_\_\_
- ☒ Information Disclosure Statement
- ☒ Form 1449 with 18 reference(s)

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Attorney Docket No. SUN-P9580

Date Mailed: October 16, 2003



☒ First Class Mail Certification

Attorney: A. Richard Park

OCT 21 2003



**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Alexandria, VA 22313-1450, on October 16, 2003

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(Typed or Printed Name of Person Mailing Paper or Fee)

Wendy Dial

(Signature of Person Mailing Paper or Fee)

**Attorney Docket No.: SUN-P9580**

**INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §1.97**

**Inventor:** Paul A. Martin, et al.  
**Title:** METHOD AND APPARATUS FOR FACILITATING DATA STEWARDSHIP  
FOR METADATA IN A DATABASE SYSTEM  
**Filing Date:** September 29, 2003  
**Serial Number:** 10/674,942  
**Group Art Unit:** To Be Assigned  
**Examiner:** To Be Assigned

Listed below or on an attached Form PTO-1449 is information known to applicant(s) and submitted pursuant to 37 C.F.R. §1.56. A copy of each listed publication and U.S. and foreign patent, except for pending U.S. applications, is being submitted herewith, along with a concise explanation of information in a foreign language, if any, pursuant to 37 C.F.R. §1.97-1.98.

Applicants respectfully request that the listed information be considered by the Examiner and be made of record in the above-identified application. If form PTO-1449 is enclosed, the Examiner is requested to initial and return it in accordance with MPEP §609.

This statement is not intended to represent that a search has been made or that the information cited in the statement is, or is considered to be, material to patentability as defined in §1.56.

X This statement qualifies under 37 C.F.R. §1.97, subsection (b) because (check all that apply):

- X (1) It is being filed within 3 months of the application filing date  
-- OR --  
X (2) It is being filed within 3 months of entry of a national stage  
-- OR --  
X (3) It is being filed before the mail date of the first Office Action on the merits.

— 37 C.F.R. §1.97(c). If this statement is being filed after the latest of: (1) three months beyond the filing date of a national application; (2) three months beyond the date of entry of the national stage as set forth in §1.491 in an international application; or (3) the mailing date of a first Office action on the merits, but before the mailing date of the earlier of a final office action under §1.113 or a notice of allowance under §1.311, then:

— a certification as specified in §1.97(e) is provided below; **or**

— a fee of \$240.00 as set forth in §1.17(p) is authorized below, enclosed, or included with the payment of other papers filed together with this statement. Please note that a check in the amount of \$240.00 is enclosed in payment.

— 37 C.F.R. §1.97(d). If this statement is being filed after the mailing date of the earlier of a final office action under §1.113 or a notice of allowance under §1.311, but before payment of the issue fee, then:

A. a certification as specified in §1.97(e) is completed below; **and**

B. a petition under 37 C.F.R. §1.97(d) requesting consideration of this statement is submitted herewith; **and**

C. a fee of \$130.00 as set forth in §1.17(i)(1) is authorized below, enclosed, or included with the payment of other papers filed together with this statement.

— This statement is being filed after the payment of the issue fee but before issuance of the patent.


— Statement under 37 C.F.R. §1.97(e) - I hereby certify that either: each item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign patent application not more than three months prior to the filing of the information disclosure statement; or no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign patent application, and, to the knowledge of the person signing the statement after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in section 1.56(c) more than three months prior to the filing of the information disclosure statement.

Signature: \_\_\_\_\_

A. Richard Park (Reg. No. 41,241)

Date

Respectfully submitted,

By:   
A. Richard Park  
Reg. No. 41,241

PARK, VAUGHAN & FLEMING LLP  
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Date: October 16, 2003



SHEET 1 OF 2

<b>INFORMATION DISCLOSURE CITATION</b>  PTO-1449				ATTY. DOCKET NO. SUN-P9580		APPLICATION NO. 10/674,942	
				APPLICANT Paul A. Martin, et al.			
				FILING DATE September 29, 2003		GROUP ART UNIT To Be Assigned	

<b>U.S. PATENT DOCUMENTS</b>						
EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE

<b>FOREIGN PATENT DOCUMENTS</b>							
EXAMINER'S INITIALS	PATENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	Translation	
						Yes	No

<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)</b>	
	Publication entitled "Concurrent Set Manipulation Without Locking", by Vladimir Lanin et al., 7th ACM Symposium on the Principles of Database Systems, pages 211--220, March 1988.
	Publication entitled "DCAS-Based Concurrent Deques", by Ole Agesen et al., 12 <sup>th</sup> Annual ACM Symposium on Parallel Algorithms and Architectures, July 2000.
	Publication entitled "Dynamic Lock-Free Deques Using Single-Address Double-Word CAS", by Maged M. Michael, Annual ACM Symposium on Principles of Distributed Computing Proceedings of the twenty-first annual symposium on Principles of distributed computing, session 1, pages 24-30, 2002, ISBN:1-58113-485-1.
	Publication entitled "A Lock-Free Mechanism for Supporting Dynamic-Sized Data Structures", Maurice Herlihy et al., Proceedings of the Twenty-Second Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC), July 2003.
	Publication entitled "Trie Hashing With Controlled Load", by Witold A. Litwin et al., IEEE Transactions on Software Engineering, Vol. 17, No. 7, July 1991.
	Publication entitled "Split-Ordered Lists - Lock-free Resizable Hash Tables", by Ori Shalev et al., Proceedings of the Twenty-Second ACM Symposium on Principles of Distributed Computing, pages 102-111, July 13-16, 2003, Boston Massachusetts.
	Publication entitled "The Repeat Offender Problem: A Lock-Free Mechanism for Supporting Dynamic-Sized Data Structures", by Maurice Herlihy et al., SUN Microsystems, Inc., Report TR-2002-112, July 2002.
	Publication entitled "A Pragmatic Implementation of Non-Blocking Linked-Lists", by Timothy L. Harris, Proceedings of the 15 <sup>th</sup> International Symposium on Distributed Computing, October 2001, pp. 300-14.
	Publication entitled "Non-Blocking Algorithms and Preemption-Safe Locking on Multiprogrammed Shared Memory Multiprocessors", by Maged M. Michael, Journal of Parallel and Distributed Computing 51(1), pp. 1-26, 1998..

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<b>FOREIGN PATENT DOCUMENTS</b>							
EXAMINER'S INITIALS	PATENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	Translation	
						Yes	No
<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)</b>							
	Publication entitled "Non-Blocking K-Compare-Single-Swap" by Victor Luchangco et al., Sun Microsystems Laboratories 1 Network Drive Burlington, MA 01803, USA research.sun.com/projects/scalable/Papers/p004-luchangco.pdf .						
	Publication entitled "Concurrent Maintenance of Skip Lists", by William Pugh Department of Computer Science, University of Maryland, CS-TR-2222.1, June, 1990..						
	Publication entitled "Skiplist-Based Concurrent Priority Queues", By I. Lotan Annual ACM Symposium on Principles of Distributed Computing, pages 113-122, Atlanta, GA, May 1999.						
	Publication entitled "Non-Blocking Timeout in Scalable Queue-Based Spin Locks", by Michael L. Scott, F Department of Computer Science, University of Rochester, February 2002.						
	Publication entitled "Trie Hashing", by Witold Litwin, 1981 ACM 0-89791-090-0, Pages 19-29.						
	Publication entitled "Linear Hashing: A New Tool for File and Table Addressing", by Witold A. Litwin, Proceedings of the Sixth Conference on Very Large Data Bases, 1980, pages 212-223. <a href="http://www.ccom.unh.edu/vislabs/cs515/Linear%20Hashing.htm">http://www.ccom.unh.edu/vislabs/cs515/Linear%20Hashing.htm</a> .						
	Publication entitled "Lock-Free Linked Lists Using Compare-and-Swap", by John D. Valois, Symposium on Principles of Distributed Computing 1995, pp. 214-222..						
	Publication entitled "Using Local-Spin k-Exclusion Algorithms to Improve Wait-Free Object Implementations", by James H. Anderson et al., Distributed Computing, 11(1):1-20, September 1997.						
	Publication entitled "Practical Implementations of Non-Blocking Synchronization Primitives" by Mark Moir, Proceedings of the 15 <sup>th</sup> Annual ACM Symposium on the Principles of Distributed Computing, August 1997.						
EXAMINER				DATE CONSIDERED			

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.